

SHELF PRODUCT' DESCRIBING DESIRED FEATURES OF CLOUD AND ITS SERVICES

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ABSTRACT

Cloud computing is turning backbone of many personnel as well as professional activities recently. Because of its novel features it is research area of many. Out of different features of cloud computing, scalability is one. As in meaning, application of cloud computing is vast and across different domains. In this paper, we introduce a term 'shelf product' for cloud computing. Shelf product is the ready prototype, basically evolutionary in nature. Shelf product provides liberty to customize the product as per the need. Different issues such as security, reliability, etc. are discussed depending on the types of clouds such as public, private and hybrid. Also the services of cloud (infrastructure, service and platform) are discussed.

Keywords: *reliability, scalability, security, shelf product.*

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I. INTRODUCTION

Portability and availability of technology are prime factors needed today. Cloud computing is cloud wherein it hold all the services which are delivered as and when required. Especially, with the third wave computing and introduction of PDA (Personal Digital Assistant), type and way in which technological services cater is ubiquitous in nature.

Prominent companies such as Facebook, Amazon, Apple, Microsoft, Google, and Yahoo are drastically changing their pattern of services. As a result of which, the way users receive the data (may be movies, music, pictures, etc) has undergone tremendous change to meet the present need. Cloud services are also promising a strong future in e-healthcare, e-governance and e-business. The paradigm shift towards cloud computing is changing continuously and with effect. This is apparent from the fact that the amount of information generated from digital devices (computers, phones, mobile devices, etc) is expected to increase 50 times by 2020. [1]

Above explanation makes it clear that the cloud services will become an inseparable part for individuals, smart devices and cloud services. Consequently, the cloud service will become backbone of many tasks. Providing convenience to user by making technology available as and when needed, at greater speed and improved quality are mottos of cloud service. [2]

II. ICT PERSPECTIVE

As cloud services will hardly live any ICT (Information and Communications Technology) field untouched, let us overview the way it affects ICT. 25 percent of the European Union's growth in GDP (Gross Domestic Product) and 40 percent of its productivity growth is result of ICT and allied activities. The aggregate sum is forecasted to exceed US\$1 trillion in Europe by 2020 based on cloud computing alone. Thus, cloud computing fixes it legs and promises a steady growth in ICT.

Furthermore, IT and telecommunication industries will blend in their services for cloud services. Apart from increasing bandwidths for cloud services, telecommunications carriers will also shift their IT systems, value-added services, and Internet data centers into the cloud, thereby, meeting the different standards and needs of various industries. This is possible by defining the common standards and uniformity in service. [2]

In this paper, we are introducing a term 'shelf product'. This product aims at increasing and improving the features of cloud computing. Different aspects of cloud services and the effect of shelf product on same, is discussed in preceding section. We provide the guidelines and framework, referring to which, the product or service in cloud should be designed. Finally,

we also comment on how shelf product has a key role to play in standardization and uniformity of cloud and its services.

A. Types of services available with cloud

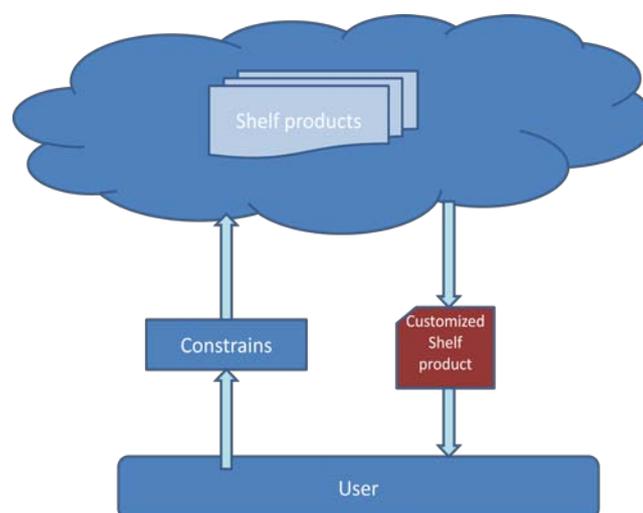
Software as service (SaaS): This constitutes the topmost layer of cloud where the software's are stored and are made available at clients' end. It encompasses features like multi-tenancy where in multiple users can access the software from single source. These services are mostly used for collaboration, business analytics, application and resource management, and platform-based integration. [3]

Platform as service (PaaS): This service involves implementing and hosting web applications, in other words, PaaS provides online platform. PaaS makes the user independent of totally purchasing software required for private or public applications. PaaS mainly provides exchange of applications, built in services, interface for users, etc. [4] It specially assists the enterprise developer as one can find the suitable platform as per the constraints such as tools and languages.

Infrastructure as service (IaaS): It is dedicated for provisioning, configuration and deployment of machines. IaaS allows user to work in infrastructure which does not belong to user. This is achieved by blending services such as virtualization, databases, etc. into one platform. IaaS aims at increasing the efficiency of an organization and reducing the cost of implementation.

III. WHAT IS SHELF PRODUCT?

Fig 1 Shelf Product



A. Shelf product

Basically, shelf product is a type of evolutionary prototype. This prototype can be customized as per the user needs. This helps in detecting and resolving early risks in the project. This is done by considering the most visible aspects of project. [5] In order to cater different domain services, the shelf product may have various generic forms depending on the domain.

B. Need of shelf product

With the ever growing nature of ICT, the amount of data generated is expected to be drastically vast in nature. Simultaneously, the user and their distinct requests from ubiquitous computing will be no exception. To meet the future needs in services, whether it may be platform as service, infrastructure as service and software as service, shelf products will pave the way. By its unique feature of customization, it will cater the needs without compromising delivery parameters such as speed, security and reliability. Even from vendors' perspective, it will aid in analysis and modifying the product according to the market scenario.

IV. DESIRED FEATURES OF SHELF PRODUCT IN CLOUD COMPUTING

A. Scalability

The most important feature in cloud computing is scalability. It is the ability to handle and store data of different kinds such as text, audio, video and so on and of variable sizes. Still it is a perplexing question, whether cloud services should be scalable or not. But this is obvious that the cloud service can be extended to users of different categories, that is, users' different requirements.

Suppose someone has to start a new business and requires software packages traditionally he has to get the packages from single source. But with the availability of cloud, the user can purchase it from different sources, saving the money eventually. [6]

B. Security

Security is one of the major concerns of cloud computing. Security schemes should have pre-planned actions for possible threats, vulnerabilities and attacks. Existing security schemes should be periodically checked and accordingly modified. There are many events where the security systems considered to be among the best had to suffer a lot because of cyber crooks. [7] One also has to estimate and handle the risk factors such as security and privacy associated with cloud and its content. This is achieved with regular analysis and updates. Clouds contain the data, which is stored across different geographical locations, role of bodies mentoring the laws and standards globally are crucial.

The shelf product is indented at providing security by option of customization. The security options and its effect are made available to the user and the user can choose the options as per the requirement. One gets to know about assets, threats and corresponding countermeasures relevant to the service. [8]

C. Reliability

Reliability of cloud may be endangered due to many reasons such as overflow, timeout, data resource missing, hardware failure, network failure, etc. On a next node, all this reasons are complementary to each other, making the situation even worse. [9]

Shelf product of cloud computing is designed to be highly reliable. This can be possibly achieved if job request is successfully served by the schedulers in time. Also the subtasks are to be completed successfully in time. Service may provide ample space for every particular kind of data to avoid congestion. Most cloud vendors have some planned downtime, but because their business is based on providing high uptime, scheduled downtimes are kept to a minimum. In addition to this, the shelf product needs to focus on the down time. Unplanned downtime is where the risk factors get involved for cloud vendors. Irregularities in big companies may also be result of unplanned downtime. The recovery from such event depends on the robustness, but this also puts the resources to the test. [10]

D. Integration

Cloud service should leave the data unaltered and completed. If the implementation of cloud service is not up to the mark this may lead to many hindrances. Thus it is must to take note of integration while designing cloud and its services.

Shelf product in cloud needs to have strong mechanism to maintain the integrity. Especially, when the services are varying and increasing tremendously, this is a challenging task. A database must remain in a consistent state before and after the transaction ensuring consistency. Atomicity which means that the transaction is aborted unless all required data elements are successfully recorded in required systems is one of the desired feature. Integration also involves isolation, which is the principle that one operation in a database system should remain unaffected by others till the transaction is complete, so that one function is not confused by an intermediate step in another function. Also the care should be taken that, the transaction record will persist once it is successfully created and the user is accordingly notified. [11]

E. Data mobility

Shelf product is platform independent. So, storing and retrieval of data is very easy in this case. As an example, if we are uploading a document from a Linux operating system, then

while retrieving for some other operating systems, sometimes it distorts the data. But in shelf product, we can upload data from one operating system and can retrieve data for some other operating system.

F. Compliance

An ideal cloud is assumed to fulfill all requests of user. Developers of cloud computing need to take security as a significant element and maintains standards of security. They need to assure users that the products are essentially protecting and securing the confidential information. Non compliance may result in poor branding of product. This usually happens as the developers do not consider security of cloud computing as a significant element. This results in low cost and faster deployment of applications but performance may not be up the mark. [12]

V. SHELF PRODUCT CONSTRAINS FOR PRIVATE AND PUBLIC CLOUD

A. Private cloud

It is restricted to a single organisation where the services are limited to an organisation only. In other words, service provided is limited to users across the firewall only. The demand of more secured and robust services have given rise to private cloud. Shelf product for private cloud should provide user the facility to design the required frame work to ensure the integrity, security and reliability of information. It also has to provide hardware, software resilience and a single point of control for security, manageability, privacy, audit, compliance and governance. [13-15]

B. Public cloud

It is a traditional cloud wherein the services are made available for general masses. Common example of such service providers are Amazon and Microsoft. General public can utilise the facilities of public cloud over the internet. Shelf product here should aim at manageability of resource as the range of users may vary from few to many. Simultaneously, the care should be taken for optimum utilization of service from providers as well as users' end. In other words, we can say that the product should be scalable enough to meet the needs. [16]

Shelf product should also focus on the recent advances in cloud like green cloud, which addresses issues of carbon consumption and hybrid cloud which blends the feature of existing types of cloud. Here, two factors are important one is service and other is cost. Hence, the preference depends on the requirements and implementation of cloud services. It would be novel scheme to introduce the flexibility at users end to customize the cloud.

C. Standardization in cloud

One of the features which are prominent for future cloud and its services is 'standardisation in cloud'. For its seamless functionality, it is must for standard to exist. As the time advances, services may demand interoperability. So, cloud and its services need to take care of it.

There are many associations and organisations which are working on standardisation of cloud, to name a few are Distributed management task force, IEEE, open grid forum, Organization for the Advancement of Structured Information Standards and storage networking industry association. Even then till date, a consolidated form is yet to be made, as cloud and its services are still considered in its early stage. One of the significant hindrances in standardisation is the inadequacy to understand the users' and vendors' perception about cloud and its services. This adds in prolonging the issue of standardisation. The bench marks and flexibility of technology must be fixed leading to stability. The way standardisation will affect the user as well as the vendor is also an important issue to be taken care of and addressed. [17-19]

VI. CONCLUSION

In this paper, we propose a term shelf product, a name assigned to generic product of cloud and its services. The constraints such scalability, security, reliability, integration and data mobility are discussed with reference to cloud. Also the do's and don'ts for the same are highlighted. Similarly, axioms for public and private cloud are also mentioned. Eventually, we comment on the effect of standardisation in cloud and its current status.

REFERENCES

- [1] G. Cook, "How Clean is Your Cloud", Greenpeace International, April 2012.
- [2] Global IT Report 2012, BR RESEARCH [Online]. Available: <http://www.brecorder.com/br-research/35:35/2420:global-it-report-2012/?date=2012-04-10>, april 2012
- [3] Cloud computing: Introduction to Software as a Service, IBM [Online]. Available: <http://www.ibm.com/developerworks/training/kp/cl-kp-cloudsaas/>
- [4] Cloud Computing Platform as a Service (PaaS), DEITEL [Online]. Available: <http://www.deitel.com/ResourceCenters/Programming/CloudComputing/CloudComputingPlatformasaServicePaaS/tabid/3065/Default.aspx>
- [5] EVOLUTIONARY PROTOTYPING, Construx Software [Online]. Available: <http://www.construx.com/File.ashx?cid=814>

- [6] Exploit The benefits Of Scalability In Cloud Computing, Kevin Tea [Online]. Available: <http://www.web2andmore.net/2012/05/09/exploit-the-benefits-of-scalability-in-cloud-computing/>
- [7] Top five cloud computing security issues, David Binning, Apr. 24, 2009 [Online]. Available: <http://www.computerweekly.com/news/2240089111/Top-five-cloud-computing-security-issues>
- [8] “Cloud Computing: Finding the Silver Lining”, Steve Hanna, Juniper Networks, Mar. 5, 2009
- [9] “Cloud Service Reliability: Modeling and Analysis”, Yuan-Shun Dai, Bo Yang, Jack Dongarra, Gewei Zhang, National Science Foundation, USA
- [10] Reliability and Cloud Computing, Virtual IT for the On-Demand Enterprise [Online]. Available: <http://www.enki.co/blog/reliability-and-cloud-computing.html>
- [11] Data Integrity and Evidence in the Cloud, W. Scott Blackmer, Information Law Group [Online]. Available: <http://www.infolawgroup.com/2010/01/articles/cloud-computing-1/data-integrity-and-evidence-in-the-cloud/>
- [12] Compliance in a Cloud Computing Environment, Kathy Argall, InfoSec Compliance Advisors [Online].
- [13] The Steps to a Private Cloud Implementation, Ritchie Fiddes, Asigra Newsletter Vol. IV, Sep. 2011 [Online]. Available: http://www.asigra.com/asigra_newsletter/issue4/5_steps_to_a_private_cloud_implementation.html,
- [14] Private Cloud (internal cloud or corporate cloud), Margaret Rouse, June 2009 [Online]. Available: <http://searchcloudcomputing.techtarget.com/definition/private-cloud>,
- [15] Cloud Computing: Public vs Private [Infographic], David Vellante, Wikibon Blog, May 12, 2010 [Online]. Available: <http://wikibon.org/blog/private-cloud-computing/>
- [16] Public Cloud, Margaret Rouse, May 2009 [Online]. Available: <http://searchcloudcomputing.techtarget.com/definition/public-cloud>
- [17] EU Puts Standardization at Forefront of Cloud Computing, Jennifer Baker, IDG News [Online]. Available: http://www.pcworld.com/businesscenter/article/223010/eu_puts_standardization_at_forefront_of_cloud_computing.html
- [18] The Problem with Cloud-Computing Standardization, **Sixto Ortiz Jr, Sep. 2, 2011** [Online]. **Available:** <http://www.infoq.com/articles/problem-with-cloud-computing-standardization>
- [19] Cloud Computing Standards – is it time?, Rick, Spe.15, 2011 [Online]. Available: <http://www.cloudtweaks.com/2011/09/cloud-computing-standards-is-it-time/>